LM TRAC 286

OWNER´S MANUAL

CE

9/2009

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INTRODUCTION TO USER

Congratulations for purhasing a new ***LM Trac multipurpose machine***. This product is designed and manufactured by **Oy LAIMU Ab**. Machine is made of high quality materials and components. All the components are supplied by well known producers. Design and production is made under high quality control and demands.

This manual includes important informations and advices for machine operation and service. You can also find useful tips how to solve possible failures. By following strictly these instructions, you can assure a long and error free life time for the machine.

All the personnel using and servicing this ***LM Trac*** machine should read through carefully this owners manual befofe starting work or service. It is also highly recommended to review this manual every now and then to keep all the instructions clearly in mind also in future.

If your ***LM Trac*** machine goes to a new owner, this owners manual should be delivered to new owner as well. This manual should be always kept in machine according the regulations.

All the directions mentioned in this manual, like left, right, front and rear, mean the directions when sitting on driver seat and looking forward (driving direction).

When ordering spare parts or service job, please inform the machine serial number and engine serial number as well. Use always only original spare parts!

Warranty is not valid if components or other constructions have broken or worn because of poor maintenance.

If you lose this manual or if the manual is damaged, contact your ***LM Trac*** dealer immediately to get a new one. You can also get more copies of this manual from your ***LM Trac*** dealer.

As we in **Oy LAI-MU Ab** continuously develop our products, we reserve the right to alter technical details without any notice. Therefore, some details of your machine may be different from those presented in this book. You can find the latest information by your ***LM Trac*** dealer: Contact your dealer immediately if you need some more information

All the informations and instructions on this manual are based on the available data on September 2009.

Copying texts or pictures in this manual even partly is forbidden.

Manufacturer is not responsible for misprints in this owners manual.

CE

General safety instructions

This symbol shows very important informations which are essential safety matters for the user and for the nature!

Safety instructions include riskable items which are very essential for machine user and for environment!

Follow always safety instructions!

Only person who is familiarized with ***LM Trac*** multipurpose machine functions can use, service or repair it. User should also be ware of all risks what can come out while using machine.
When using or servicing the machine, all the currently valid rules and regulations in country should be followed.

Follow always current traffic regulations and safety instructions when using the machine.

Follow always service and adjustment instructions mentioned on this manual. Only this way an error free and safe machine use can be quaranteed.

Also an appropriate machine service and maintenance is required. All the service and maintenance should be performed according manufacturer´s instructions.

It is not allowed to transport passangers on machine if there is no additional seat for that purpose. It is also forbidden to carry passangers on implements.

Manufaturer is not responsible for damages caused by unauthorized modifications or tuning of machine. Neither manufacturer is responsible for damages caused by use of no original spare parts and implements

If some failures occurs, stop the working immediately. Turn off the engine and contact an authorized ***LM Trac*** workshop.

Applicability:

LM Trac 286 multipurpose machine is designed only for real estate maintenance and gardening jobs.

Other kind of usage is absolutely prohibited. Manufacturer takes not any responsibility for damages which have caused by inappropriate use or operation - operator is then the one and only responsible for all damages.

Safety instructions

Read through carefully the safety instructions on following pages.

Follow always the given instructions.

Follow always the safety instructions in order to avoid accidents and damages. Read through carefully all the safety instructions before using the machine. Machine owner is responsible that all the safety instructions and rules are understood and followed. This owners manual should always stored in machine where every user can find it easily.

1. BEFORE USE

a) Get familiar with all fuctions in machine and find out all the limitations of use and features. Read through this manual carefully before starting the engine.

b) Follow always all the warning and instruction labels on machine.

c) Never use machine under influence of alcohol, drugs or narcotics. Also a fatigue may cause dangerous situations.

d) Check the working area before starting to work or connecting implements.

e) Never use loosen clothing because they can attach on machine rotating parts or on control levers causing dangerous situations or even accidents. Use always decent working clothes which are made of steady materials, safety helmet, safety boots, eye protector, ear plugs, safety gloves etc... as the safety regulations require.

f) Do not transport other people with the tractor or implements.

g) Check all the mechanical parts - wearings and right settings. Replace worn or broken parts immediately. Check regularly that all the bolts, nuts and other joints are tight.

h) Keep the machine always clean. Oil, dust and other dirts piled up all over the machine may cause risk of fire.

i) Use only implements and accessories accepted by machine manufacturer.

j) Be sure before starting the engine that there is enough fuel and oil and machine is serviced and greased carefully.

k) Never make any "own changes" for frame construction, because it may cause unexpected danger situations.

l) Do not lend the machine to an unexperienced user. You are responsible if the machine causes damages.

2. DURING THE USE

a) Climb always safely on and off the cabin. Use handles and steps. Never use control levers or other controls to help climbing up. Never jump into the cabin or out there.

b) Start the engine and use the machine always when sitting on the drivers seat. Never get off the seat while engine is running.

c) Be always sure before starting the engine that all the controls are on neutral position and all the hydraulic and electrical devices are switched off.

d) Never start engine by short circuiting starter motor terminals or never try to pass by the ignition switch to start engine, because the machine can then move abruptly and cause danger situation.

e) Never start or run the engine in closed or poorly ventilated space. Beware of carbon monoxide poisoning.

f) Be always sure that safety guards and devices are installed during machine usage. Replace missing or broken safety devices immediately.

g) Avoid excess tilt on leaning ground. Don´t change speed range on slope. Do not drive the tractor on too leaning slopes or near edges.

h) Keep all the doors and shutters closed while driving. Never use machine controls outside of the cabin.

i) Use the controls always in safe way. Press driving pedal slowly to avoid abrupt mowing.

j) Make a careful plan for driving lines before start. Avoid loosen obstacles and other matters.

k) Be extra careful when it´s raining or when the ground is slippery, snowy or icy.

l) Observe always other people, especially KIDS and DOGS in working area!!! Control all the time on the direction of travel. Use the rotating warning light according traffic regulations.

m) Notice that balance of machine will be changed by different loading and place of load. Try to keep implements and other weights always as low as possible during driving.

n) Use as much as possible the engine braking when driving downhill.

o) Never change drive direction or speed abruptly when driving on slope or otherwise inclined surface.

p) If the machine falls over, hold on the steering wheel and handles. **DO NOT JUMP OUT !**

q) Follow always strictly implement´s user manual and safety instructions.

r) Never go between machine and implement when engine is running. Switch on parking brake and use wheel chocks when connecting and disconnecting implements.

3. AFTER USE

Parking the machine:

- Park the machine always on a flat and hard surface
- Lower down on the ground all the implements.
- Stop the engine
- Remove the ignition switch
- Lock the doors

4. MAINTENANCE

Place the machine always on flat and hard surfare while servicing it. Lower down all the implement and stop the engine. Notice that hydraulic and cooling systems may stay pressurized and hot after engine stop. Wait long enough to cool down these systems. Be careful when opening these systems - they may be under pressure. Pressurized hydraulic oil or coolant may cause serious injuries when spreading out.

a) Let the engine, exhaust pipe, cooler and hydraulic components cool down sufficiently before starting the service job.

b) Stop the engine while refueling. Avoid to splash fuel while filling the tank. Never overfill the fuel tank!

c) Never smoke while refueling or servicing the battery! Avoid sparks and open flames nearby battery and fuel tank. Explosive fumes will be relieved especially when battery is recharged.

d) Read the chapter "*Starting with booster cables*" carefully before starting the engine with booster cables.

e) Never lay down any metallic objects over the battery, for example tools - risk of short circuit

f) Avoid short circuits and sparks! Disconnect always the battery grounding cable (**-**) first and since then the positive cable (**+**). When connecting cables, connect always the grounding cable at last.

g) Have the first aid kit and fire extinguisher always available.

h) Do not open the cap of the cooling system while the engine is hot or it is still running. Wait until the engine has cooled down and open the cap "on the first" position when the pressure drops slowly but safely.

i) The high pressured hydraulic oil may penetrate under skin and cause serious injuries while spurting out. A small leak is visually almost impossible to locate. Never check the hydraulic leaks with bare hands, use for example a piece of cardboard for checking. Use always face protector and safety gloves. Contact a doctor immediately if oil gets under skin where it may cause infections or serious allergic reactions.

j) Battery includes dangerous heavy metals. Batteries should always be disposed according the current regulations.

k) Waste oils, coolants, solvents, batteries and battery acids should always be disposed according current recycling regulations. NEVER RELEASE over mentioned MATERIALS INTO THE GROUND OR NATURE !!!!!

l) Use always face or eye protector. In certain situations it is also recommended to use respirator mask

m) Never go underneath the machine if it´s not supported safely up. Use always strong enough devices for supporting.

5. STICKERS AND SIGNS

a) Follow always the instructions on stickers and signs.

b) Keep the stickers and signs always clean and easy to read.

c) When needed clean stickers with soap water and wipe them with dry and clean rag.

d) Replace broken or worn sticker immediately with a new one.

e) If a machine component including warning stickers or signs will be replaced, should a new similar sticker attach on the same place where the original sticker was situated.

f) Attach the new stickers only on a dry and clean surface.

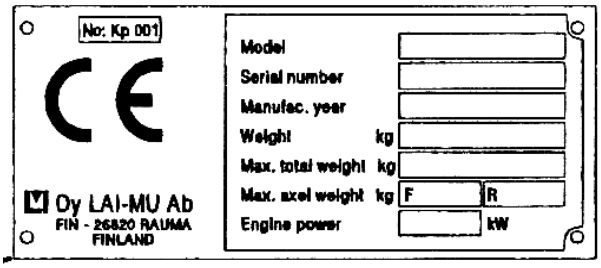
Machine identification

Authorized ***LM Trac*** services will help you to take care of your machine maintenance. In this Owners Manual you can find information to achieve some daily operations. In more demanding service tasks, please contact your authorized service point.

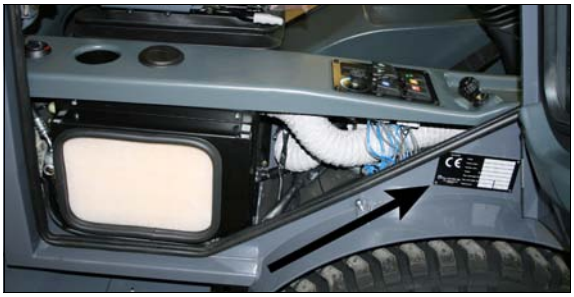
Use only original spare parts.

When ordering spare parts and services, please have the machine model and serial number available. Notice also all the accessories included in machine. In this way the spare part service and maintenance will be easier and quicker.

Identification plate



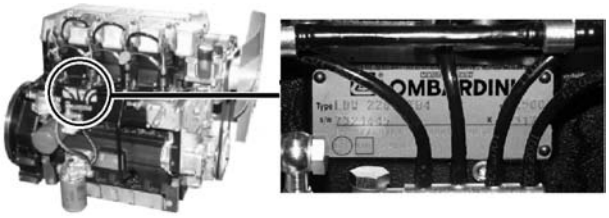
The machine identification plate is located behind the right door.



Machine serial number

The machine serial number is located on identification plate and marked on frame, on right side.

Engine serial number



Engine serial number is on engine identification plate which is located on the left side of cylinder block behind the fuel pump.
On engine identification plate you can find engine type as well as engine serial number (s/n). You can also find the marking of EU machine directive on the lower part of plate.

Write down your machine data here.

Basic machine:

Model:	
Serialno:	

Engine:

Type:	
Serialno:	

Delivery date: _____

Dealer: _____

GENERAL DESCRIPTION

LM TRAC 286 is a special utility machine. To obtain the maximum performance, you should familiarize yourself with operation principles of the machine. Lightness of machine and relatively small engine power do not enable you to work with "raw power", but you should abuse the many multipurpose features of machine in best possible way.

LM TRAC 286 has a component structure which means fast and easy maintenance and repair. The power source, Lombardini LDW 1603 CHD Plus diesel engine, and attached hydraulic pumps for driving, working, and steering build up a totality which rests on rubber cushions preventing engine vibration from causing noise and vibration in the cab. Safety cabin is also connected with rubber dampers to minimize noise level.
Implements will be connected to the front of the tractor located implement connection (A-frame type). Fuel and hydraulic oil tanks and battery are located low by the side of the frame to get low centre of gravity. Tractor is rear wheel steered.
Power transmission for driving is fully hydraulic which makes flexible automatic forward-backward driving possible. Driving foot pedal replaces the traditional clutch-accelerator brake-gear functions of mechanical power transmission.
Engine speed will be adjusted with a hand gas lever and driving direction will be selected with foot pedal. When you press driving foot pedal with the ball of the foot, tractor moves forward. When you press with the heel, tractor goes backwards.
Position of the pedal determines the amount of oil produced by the driving pump for the driving motors in each wheel hub. The more you press the driving pedal the greater is the amount of oil and the the speed is higher. When you reduce pressure from the driving pedal, the machine automatically brakes. The same applies to backward driving.

Variable-volume axialpiston pump (driving pump) is driven by 3-cylinder diesel engine without turbo. Wheel motors in each wheel (2 pcs in 2-WD and 4 pcs in 4-WD) are powered by this driving pump.

Driving speed control is continuous over the whole speed range.

LM TRAC 286 speed ranges:

2-WD:	Fast	0-20 km/h
	Slow	0-10 km/h
	Reverse:	Max. 10 km/h
4-WD:	Fast	0-13 km/h
	Slow	0-6,5 km/h
	Reverse:	Max. 6,5 km/h

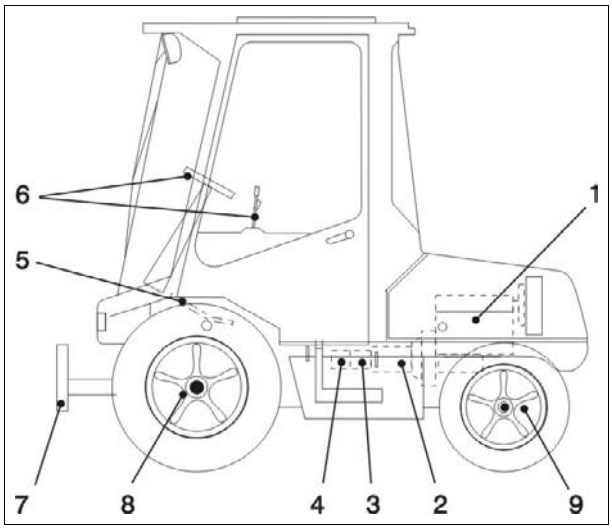
Traditional differential lock is replaced by electro-hydraulically controlled valves which control the amount of oil flowing into the hub motors, ensuring maximum tractive power for each wheel. To use the machine effectively the driver must understand the principle of this automatic hydraulic driving system.

The hydraulic working system is also unconventional. The implements get their operating power hydraulically from the ***LM Trac 286*** basic machine. The power source is a standard volume gear pump.

The machine has a hydrostatically assisted rear wheel steering system. Steering is operative also when the engine is off, but then it is very stiff. The system consists of a separate pump, control valve (orbitrol), and one steering cylinder.

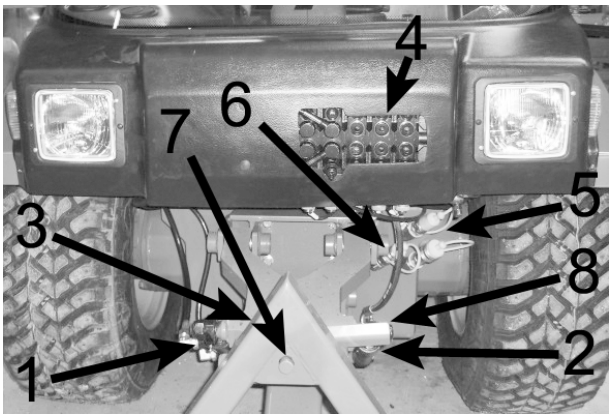
In connection with the hub motors on the front and rear (4-WD) axles the machine has oil bath lamella multidisc brakes that function both as driving and parking brakes. In practice, the driving brakes are provided by another brake system, ie. the automatic brake function of the fully hydraulic power transmission.

MAIN COMPONETS



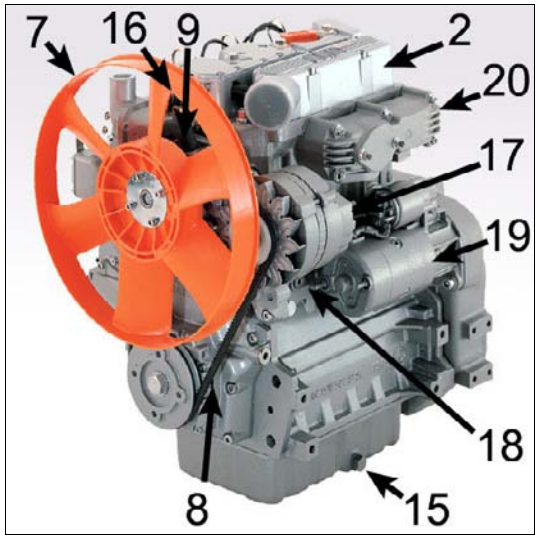
1. Engine
2. Driving hydraulics pump
3. Working hydraulics pump
4. Steering hydraulics pump
5. Driving and brake pedals
6. Steering and controls
7. A-frame (front lift)
8. Hub motor
9. Steering cylinder

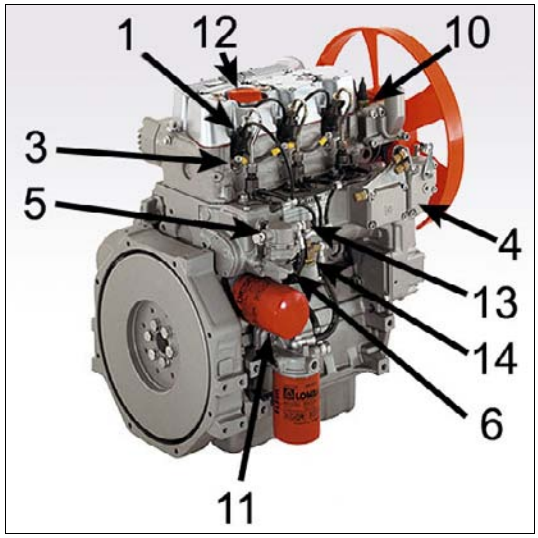
IMPLEMENT CONNECTION (A-frame)



1. Lift cylinder
2. Unload cylinder
3. A-frame
4. Quick couplings for cyl. hydraulics (3 pairs)
5. Quick couplings for motor hydraulics
6. Bleed oil coupling
7. Lock pin
8. Locking lever

ENGINE





1. Injection nozzle
2. Intake manifold
3. Glow plugs
4. Injection pump
5. Fuel pump
6. Manual hand pump for fuel
7. Fan blade
8. Fan belt
9. Coolant circulation pump
10. Thermostat
11. Oil filter
12. Oil fill gap
13. Oil dipstick
14. Oil pressure switch (engine oil)
15. Oil drain plug
16. Breather gap
17. AC alternator
18. Engine block heater (option)
19. Starting motor
20. Exhaust manifold

COUNTERS AND CONTROLS

STEERING COLUMN, RIGHT SIDE PANEL, HAND GAS AND RIGHT ARM SUPPORT

SWITCHES ON STEERING COLUMN

FOOT PEDALS

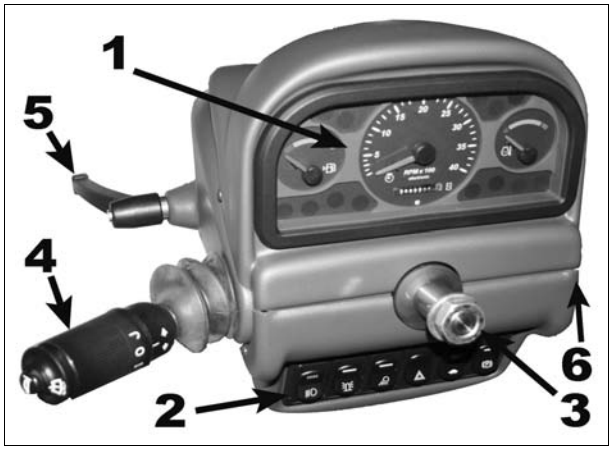
CABIN ROOF EQUIPMENTS

WATER VALVE

FUNCTIONS OF COUNTERS AND CONTROLS

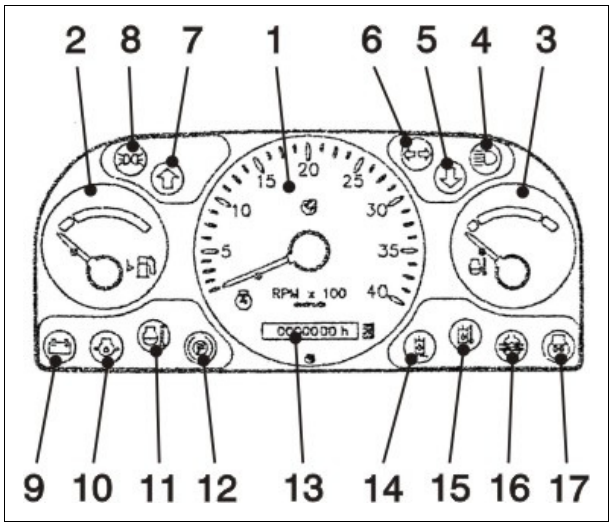
STEERING COLUMN

Adjustable steering column includes several controls for machine handling. Check more information for steering column tilting on page 18.



1. Counters and signal lights
2. Switches on steering column
3. Steering wheel
4. Multipurpose lever
5. Steering column tilting lock lever
6. Ignition switch

1. COUNTERS AND SIGNAL LIGHTS



1.1 Tachometer

Tachometer tells engine rpm.
RPM = Indication x 100.

1.2 Fuel gauge

When the pointer approaching red area, about 7 ltr fuel is left.

1.3 Engine temperature meter

Engine temperature is suitable when the pointer is on green area. When engine is overheated, the pointer is on red area and the warning light (**11**) comes on. Set the engine idling immediately and let it cool down for a moment. Stop the engine and find out (and clean) the error maker before you go on working. When the pointer is on blue area, the engine temperature is too low. Warm the engine up to normal usage temperature before hard loading of machine (green area). In very cold conditions, it is recommended to use "cooler" thermostat. The fuel economy is good only when the pointer is on green area.

1.4 Signal light for high beam (blue)

Signal light ON, when high beams are on.

1.5 Not used

1.6 Signal light for blinkers (green)

Signal light BLINKS, when blinker (left or right) is on.

1.7 Not used

1.8 Signal light for parking lights (green)

Signal light ON, when parking lights are on.

1.9 Warning light for charging (red)

Warning light comes on, if some errors occur to battery charging system. Stop the engine immediately and find out (fix) the problem(s) before going on working. This warning light should come on when the ignition is switched on, but it should go off when engine runs.

1.10 Warning light for engine oil pressure (red)

Signal light ON, when engine oil pressure is too low.

1.11 Warning light for engine overheating (red)

Signal light ON, when engine is overheated, more information on chapter *1.3 Engine temperature meter.*

1.12 Signal light for parking brake (red)

Signal light ON, when parking brake is switched on.

1.13 Driving hour gauge

Driving hour gauge tells the total usage hours of machine, for ex. to define service intervals. Indication numbers are hours and 1/10 hours.

1.14 Not used

1.15 Warning light for hydraulic oil return filter blocking (red)

Signal light comes on when hydraulic oil return filter is stucked. Stop the engine immediately and change the return filter element.

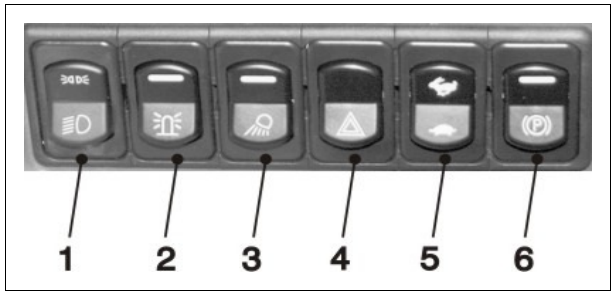
1.16 Not used

1.17 Signal light for glowing (yel)

Glowing signal light comes on when ignition is switched on. After few seconds, the light goes off and the engine can be started. Glowing period depends on weather temperature. In cold weather, the time is longer before the signal light goes off and engine can be started.

2. SWITCHES ON STEERING COLUMN

Swiches include also a signal light for each function as well.



2.1 Switch for driving lights

3-positions switch
OFF / Parking lights ON / Driving lights ON.

2.2 Switch for rotary warning light

ON / OFF-switch

2.3 Switch for front working lights

ON / OFF-switch

2.4 Switch for hazard blinkers

ON / OFF-switch

2.5 Speed range selector

2-positions switch to select driving speed range. Driving range selection should be always done while machine standing in place.

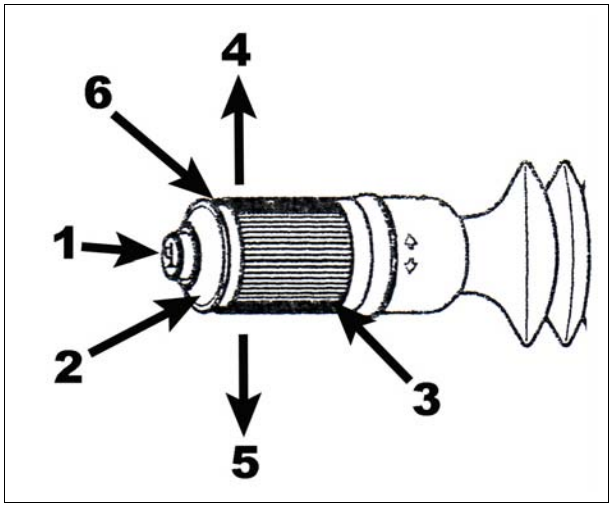
Rabbit = Fast speed range
Snail = Slow speed range

2.6 Switch for parking brake

ON / OFF-switch

3. STEERING WHEEL

4. MULTIPURPOSE LEVER



4.1 Horn

Horn on when the push button in the middle of lever will be pressed.

4.2 Windshield washer

Windshield washer on when the outer ring on the lever will be pressed.

4.3 Windshield wiper

Windshield wiper on when sleeve shown by the arrow will be rotated. 4-positions switch. OFF / Drizzle / Slow wiper / Fast wiper.

4.4 Blinker right

When lever turned ”upwards”.

4.5 Blinker left

When lever turned ”downwards”.

4.6 Low beam / High beam

High beam on when lever pushed ”forwards” and back to low beam when lever pulled ”backwards”.

5. STEERING COLUMN TILTING

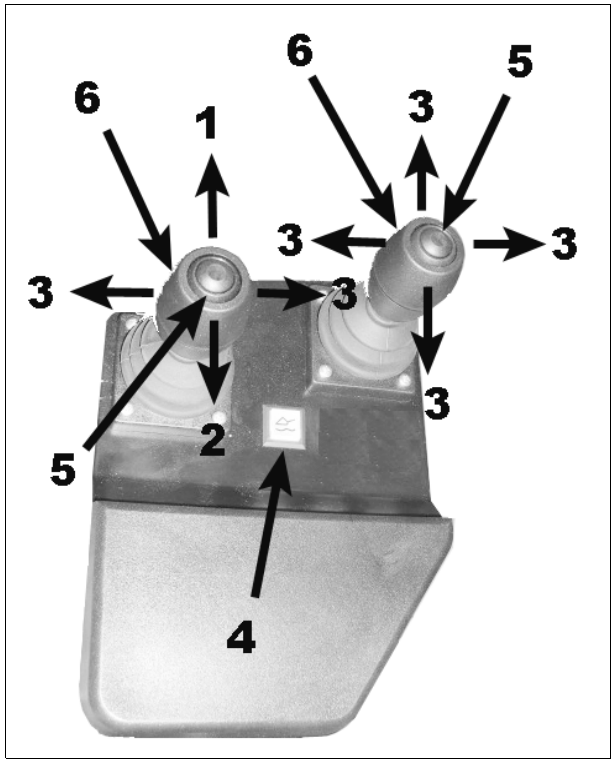
Steering column can be adjusted on the most ergonomical position suitable for each size driver. Tilting can be done quick and easily with the help of lever type locking device. Locking screw should be always tighten carefully after adjustment.
Adjustment should be always done when machine standing still in place.

6. IGNITION SWITCH

Check ignition switch functions on page 19.

RIGHT ARM SUPPORT

Joystick-levers are located on the right arm support which position can be adjusted. Front lift and cylinder hydraulics can be controlled by Joysticks. Please read more information about arm support height/tilting adjustments on page 18.



1. Front lift down

2. Front lift up

3. Functions for cylinder hydraulics

With these Joystick functions can 3 pcs hydraulic cylinders connected on machine be controlled at the same time.

4. Floating for front lift

5. Not used

6. Not used

SWITCHES ON RIGHT SIDE PANEL

1. Switch for rear working lights

ON / OFF-switch. Signal light on switch lights as well when rear working lights are switched on.

2. Switch for differential lock

Spring loaded switch. Switch should be pressed continuously to have differential lock switched on. Switch will return automatically OFF-position when released.

3. Switch for motor hydraulics

3-positions switch, ON / OFF / ON. Motor hydraulics can be driven on two directions depending on switch position. Motor hydraulics is OFF when the switch is on middle position.

4. Selector for 4-WD / 2-WD

ON / OFF-switch. 2-WD is used in OFF-position.

5. Switch for seat and mirror heater

ON / OFF-switch. Signal light on switch comes on when seat/mirror heating is switched on. Switch off the heating immediately when it´s not needed.

6. Switch for hydraulic tipper

3-positions switch, ON / OFF / ON for hydraulic tipper, up/down. On the middle position (OFF) the platform stays where it is at the moment when switched off.

7. Switch for heater / AC fan

4-positions switch, (0),(1),(2) and (3). The switch should be at least on position (**1**) in order to get AC-apparatus switched on.

8. Switch for AC

ON / OFF-switch. Signal light on switch lights as well when AC is switched on.

9. Regulator for AC

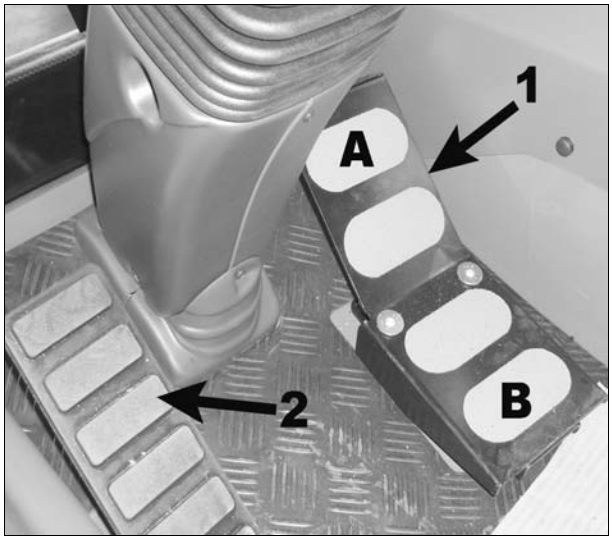
Cabin cooling volume can be adjusted by this regulator.

10. Not used

HAND GAS

Engine rpm control with hand gas:
Push the button on middle of knob and pull the whole knob outwards to adjust the engine rpm. Fine tuning can be done by rotating the outer sleeve of the knob.

FOOT PEDALS

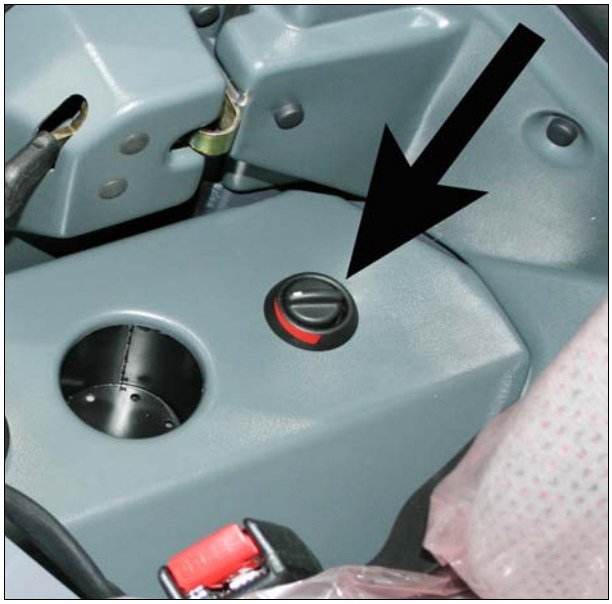


1. Driving pedal

- When pressed with toes (**A**), machine moves **FORWARDS**.
- When pressed with heel (**B**), machine moves **BACKWARDS**.

2. Brake pedal

WATER VALVE



On the rear right corner of the cabin you can find a water valve to control cabin heating volume. RED=Warm, BLUE=COLD.

MACHINE OPERATION

GENERAL

Avoid physical injuries:
Use always safe working methods.
Follow all the instructions on this book concerning safe use of machine.
Never use machine which is broken.
All the services should be performed according the service table in this manual .
Read very carefully the chapter "*IMPORTANT*" before using this machine.

IMPORTANT:

Make yourself familiar with all the controls and operations on machine before you begin to drive.

Read the operation instructions given here.

Also, read the safety instructions given at the beginning of this manual and keep them clearly on your mind while working.

Check always before driving that the lights, indicators, meters and controls are in order and they are functioning also during the driving.

Make the daily checks according the maintenance program before starting engine.

First 50 hours

Flexible use and varying loads help the machine to reach a long and economical life. Remember that the running-in of a new machine affects the durability of the machine later.

- Let the engine run idling to warm up hydraulic oil before loading machine.
- Never idle or use machine with full load over 5 min period.
- Avoid stable speeds in long period.
- Avoid sudden brakings and changes of driving direction.

NOTE !!!

Observe engine oil pressure and engine temperature during usage. Check regularly engine oil level and coolant level. Check also that all the nuts, bolts and hoses are tightly fastened (wheels, exhaust manifold, etc.). Tighten if needed.

GENERAL OPERATION INSTRUCTIONS

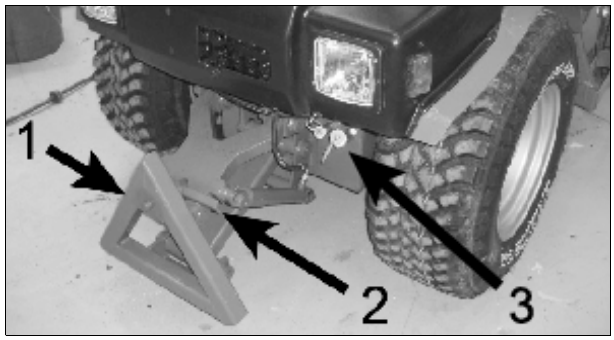
Driving

Driving functions of ***LM TRAC 286*** is made by hand gas and driving pedal. There are two different speed ranges controlled by electrical switch (Fast and Slow). First a suitable engine rpm will be set by hand gas which after the wanted driving direction is selected by driving pedal. When pressed the pedal by the ball of the foot, the machine moves FORWARDS and when pressed driving pedal by heel, machines moves BACKWARDS.

Machine should stand still always when the driving direction will be changed. If the diversion is made during machine is moving, some transmission parts may get broken.

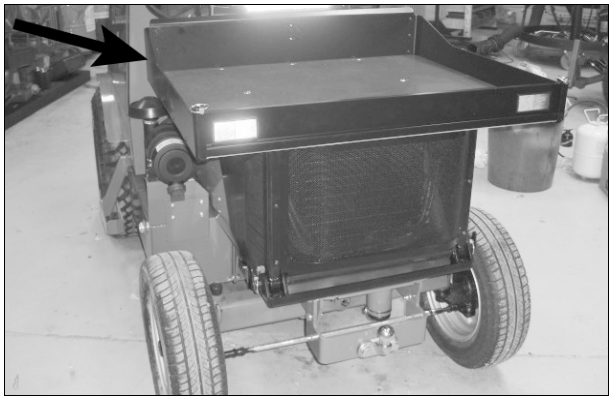
The more driving pedal is pressed, the faster machine moves. Driving pedal do not affect on engine rpm but all the engine rpm controls are made by fine adjustable hand gas lever. Driving speed can be set stepless on both speed ranges on forwards driving as well as on backwards driving. When releasing the driving pedal, speed will be decreased and the hydrostatic transmission acts like a brake. If you release driving pedal very quickly, machine brakes abruptly which may lead to dangerous situation. So relieve the pedal always slowly. Brake pedal is normally needed only when trying to keep machine stand still on slope.

Front implement connection



Implement connection is made with an A-frame (**1**). A-frame is to be connected to the corresponding frame on implement. The connection has to be made sure with a locking plug used by lever (**2**). Hydraulic driven implements should be connected on quick couplings (**3**) on base machine. Be always absolutely sure that the implement is steadily locked on A-frame.

Engine hood

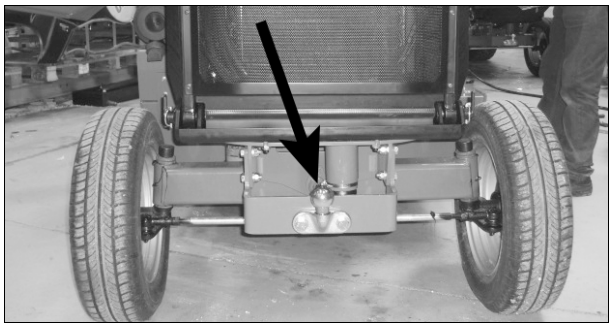


Engine hood can be tilted manually or hydraulically. Different implements like water container or sand spreader can be carried on engine hood. It can be also used as a platform to carry hand tools and for example sand. Notice the max. rear axle load when loading the platform.

Notice also during driving the weight of implement or load on platform because the machine balance is essentially different from unloaded machine and it can easily fall down on curves when driving very fast.

NOTE !!!
Never overload the engine hood.

Trailer hitch



Trailers and towed implements can be connected on machine If it is equipped with a trailer hitch.

The diameter of trailer hitch ball is 50 mm.

Observe always current road traffic rules.

CHECKS AND ADJUSTMENTS BEFORE USE

Daily checks

It is very important to avoid damages. Check the machine always before starting the engine.

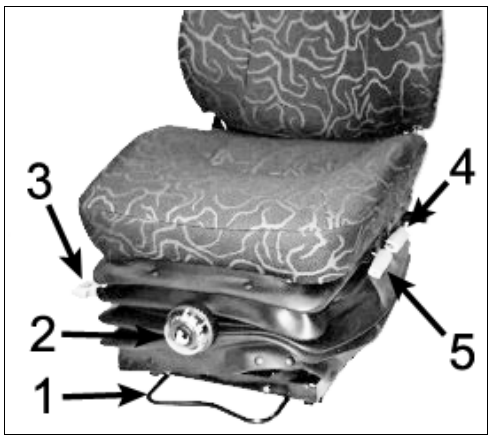
Avoid physical injuries:
Machine service should always be performed when machine is standing on stable ground. Engine should be stopped, parking brake switched on and implement lowered down on the ground.

- Walk around the machine and check all the possible wearings or damages
- Check the engine oil level
- Check the coolant level
- Clean the cooler mask and the cooler
- Refuel if needed
- Check the hydraulic oil level
- Clean the air filter dust cap
- Check that all the warning lights are functioning as well as the driving hour gauge indication
- Check that driving lights are functioning
- Check the safety cabin state
- Check the state of all signs and labels

Seat adjustments

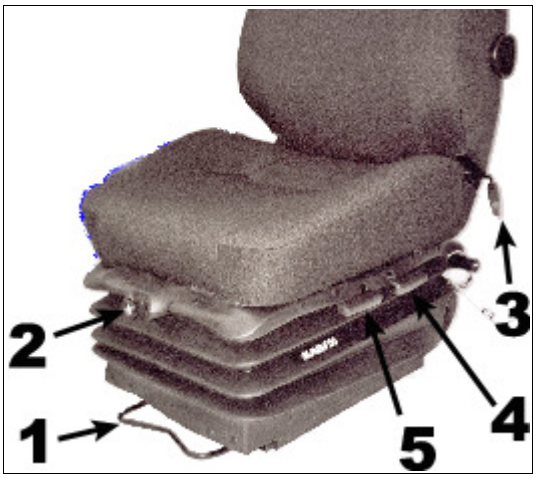
MECHANICAL SUSPENSION SEAT:

Avoid physical injuries:
Never make seat adjustments while machine is moving.



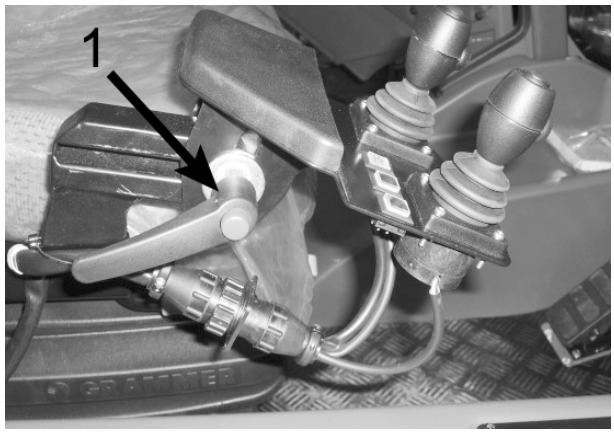
1. Seat distance adjustment
2. Driver weight settings
3. Backrest adjustment
4. Seat cushion rear end adjustment
5. Seat cushion front end adjustment

AIR SUSPENSION SEAT:



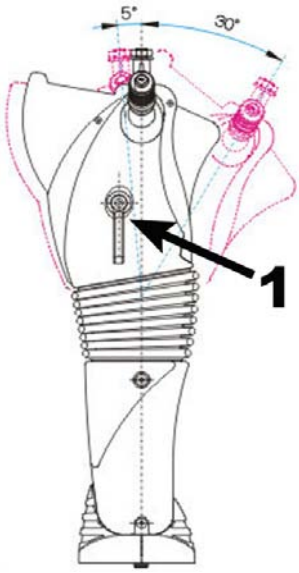
1. Seat distance adjustment
2. Driver weight settings
3. Backrest adjustment
4. Seat cushion rear end adjustment
5. Seat cushion front end adjustment

Arm support adjustments



The height, inclination and distance of right arm support can be adjusted by loosening first the locking screw with lever (**1**). After that the arm support can be adjusted stepless on most ergonomical position. Lock the screw carefully after adjustment.

Steering column adjustments



Steering column inclination can be adjusted by loosening first the locking screw with lever (**1**) on left side of column. Adjust then the column on wanted position (inclination) and tighten the locking screw carefully.

Avoid physical injuries:
Never make steering column adjustments while machine is moving.

ENGINE USE

Avoid physical injuries:
Read all the safety instructions and get familiar with all the warning plates. Don´t run the engine in closed place.
Never start the engine while standing outside the cabin. Be seated steadily on driver seat when starting engine.

IMPORTANT:

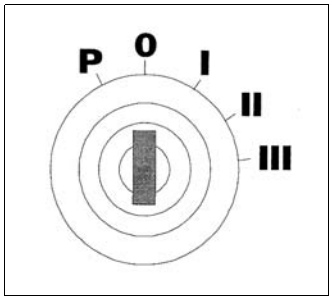
Never use any chemicals like Aerostart or ether to help engine start. Never use starter motor more than 30 s at a time.

If engine does not start on that 30 s time, wait about 2 min before next try.

Machine is equipped with a start preventing function and the engine will start only when parking brake is switched on and motor hydraulics is swithed off.

Starting the engine:

1. Be sure that parking brake is switched on (**start preventing function**)
2. Be sure that motor hydraulics is switched off (**start preventing function**)
3. Be sure that also all the other functions and controls are swithed off or are in neutral position
4. Turn the hand gas on the middle position
5. Switch on ignition and be sure that all following cue lights are on:
   - Oil pressure warning light
   - Charging warning light
   - Parking brake cue light
   - Glowing cue light (automatic glowing)



P - Not in use

O - Main power OFF

I - Main power ON + autom. glow

II - Not in use

III - Starting (**START**)

6. Machine is equipped with a so called automatic glowing like passanger cars. Glowing will be switched on automatically when ignition is switched on. Glow cue light on dashboard lights and turns off when engine can be started. Start the engine by turning ignition switch on START position. Outer temperature affects on glowing period.
7. Release the ignition key immediately after engine has started and adjust the engine rpm almost idling.
8. Be sure that engine oil pressure warning light and charging warning light go off. If some warning light blinks, stop the engine at once and find out the failure. Repair!

STARTING THE ENGINE ON VERY COLD WEATHER

In very cold weather it is recommended to glow engine more than normally. If engine does not start on first try, please glow more and try to start again. Remember always the limited battery capacity in very cold conditions.

OPERATIONS AFTER ENGINE START

In very cold conditions warm up the engine before loading it heavily. A cold engine will be worn much faster than a warm one.

Let the engine run at 1500 rpm for about 5 to 10 minutes depending on the temperature. During this time, the feed pump circulates and warms up the oil.

If you try to drive with cold oil, the hydraulic circuit makes a strange, whirring sound >> the pump cavitates and may break down.

Hydraulic oil is recommended to warm up by using slowly some hydraulic functions, like lifting and lowering A-frame.

NOTE !
Use always the engine block heater and hydraulic oil heater in very cold circumstances.

Don´t load the cold engine heavily!

STARTING WITH BOOSTER CABLES

Avoid physical injuries:
Battery includes explosive gases. Avoid always open flame and sparking nearby the battery. Never smoke near the battery.
Never use booster cables for starting if the battery is frozen.
Follow always instructions below.

Battery is located on the right side of the machine, in front of the fuel tank. Remove the battery cover in order to access the battery terminals.

Starting with booster cables as follow:

1. Drive the machines as close as possible to each other. BE SURE THAT MACHINE FRAMES DON´T CONTACT EACH OTHER!
2. Switch off all the implements and controls in both machines
3. Use always eye protectors and safety gloves.
4. Connect first battery positive terminals (**+**) to each other with red booster cable
5. Connect first the other end of black booster cable to the grounding terminal (**-**) of booster battery and not until then the other end on the engine frame of aided machine
6. Start the engine of boosting machine and let it run for a while
7. Start the aided machine
8. Remove the booster cables on opposite direction as connected

STOPPING THE ENGINE

Avoid physical injuries:
Lower down always all the implements and switch on the parking brake before stopping the engine.

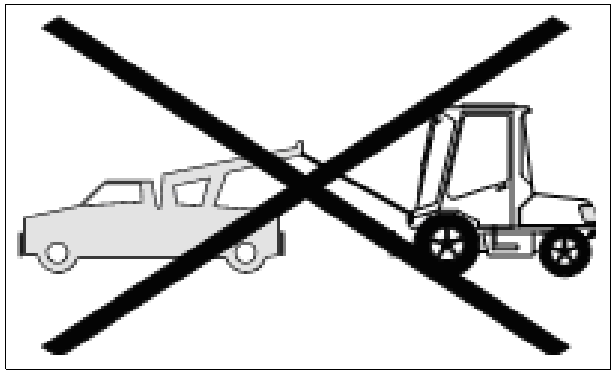
1. Place the machine on a flat and hard surface
2. Lower down all the implements and switch on the parking brake
3. Adjust the engine idling and turn all the controls on Neutral-position or switch them OFF
4. Let the engine run idling for a while in order to cool it down.
5. Stop the engine by turning the ignition key to the 0-position. Remove the ignition key
7. Lock the cabin doors before leaving the machine

FUEL

Fuel should be according DIN EN590 standard. House heating gas oil is not allowed to use. If tax free fuel is used, it should be according the over mentioned standard gas oil for working machine use. Diesel-fuel can also be used in this machine. Notice always the weather conditions and use corresponding fuel type; winter or summer quality.

TOWING

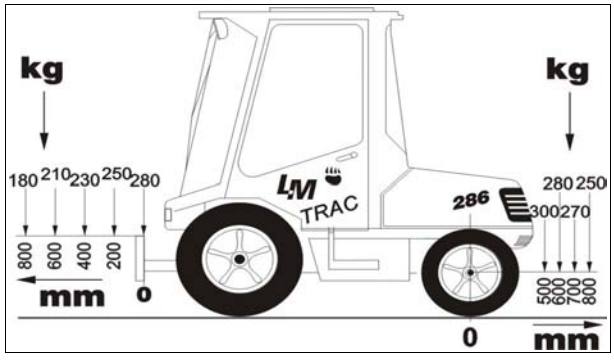
IT IS NOT ALLOWABLE TO TOW THE MACHINE !!!



MAIN RULE:

If some damages happen, it is not allowed to tow the machine. If the machine should be moved, it has to be done with a trailer or truck.

LOADING TABLE



Enclosed picture shows each max load what is allowed to carry in each distance.

MAINTENANCE

General

Reliability of the machine largely depends on correct and regular maintenance. The maintenance costs are quite small compared to repair costs.
The most important service is the maintenance performed by the user. This maintenance includes greasing, checks and adjustments.
The periodic maintenance program presented in this chapter applies to normal driving conditions. In more demanding use, the machine should be serviced more often.

Avoid physical injuries:
Place the machine always on flat and hard surface while servicing it, switch on parking brake, lower down all the implements and stop the engine.
Turn OFF the ignition switch and remove the ignition key.
Place a sign in steering wheel telling "DO NOT START - MACHINE IS UNDER SERVICE"

Avoid physical injuries:
Follow always instructions below if the service procedure requires machine to be lifted up:
Use only strong enough lifting devices suitable for safe lifting job.
Support the uplifted machine always with approved and robust enough brackets. Never go under an uplifted machine if it´s not supported up according the regulations.

Avoid physical injuries:
Be very careful when servicing targets which are pressurized.

Avoid physical injuries:
Support the implement always steadily up when service job should be done under device.

Avoid physical injuries:
Follow always safe working methods when servicing the machine.
All the valid safety regulations and rules as well as all the other instructions improving satety, should be always followed.

Locations of service points

Certain service points are located behind the openable shutters and covers. Close all the opened shutters and covers carefully after service work.

Avoid physical injuries:
Never start the engine when some shutter is open or missing.

Hazardous wastes

Collect carefully all the hazardous wastes while servicing the machine.
Waste oil, used filters, antifreeze agents and brake fluids should be delivered to recycling stations or to hazardous waste disposal plants.
Batteries includes corrosive acids and heavy metal particles. Batteries should be disposed according the current regulations.
Oily rags should also be delivered to recycling stations according the regulations.
Never drop hazardous wastes on to the ground or into sewer because they will cause there serious environmental problems

Important:
Hazardous wastes should always erase according the regulations. Take care of the clean environment. Never drop wastes on nature!

Avoid physical injuries:
Never open hydraulic couplings unless you are absolutely sure that the hydraulic system is unpressurized.
Hydraulic system services and repairs should be carried out by authorised ***LM Trac*** workshop.

SERVICE TABLE

SERVICE ITEMS	DAILY	125 h	250 h	500 h	1000 h	2000 h
1. Check operations of cue lights	X					
2. Check engine oil level	X					
3. Check amount of coolant	X					
4. Clean engine air filter and check pressure indicator of air filter line	X					
5. Check hydraulic oil level	X					
6. Check windscreen washer tank filling	X					
7. Grease nipples (weekly or at least 50h)	(X)					
8. Check items 1-7		X				
9. Check fan belt tightness		X				
10. Check battery fluid level		X				
11. Change engine oil		X				
12. Check tightness of wheel bolts		X				
13. Clean radiator, oil cooler and AC-cooler		X				
14. Clean cabin incoming air filter			X			
15. Change engine air filter			X			
16. Change engine oil filter			X			
17. Clean fuel water separator and change fuel filter			X			
18. Check oil leaks, joints tensioning, couplings and hoses			X			
19. Check tyre pressures			X			
20. Check brake functions			X			
21. Change hydraulic oil return filter element				X		
22. Change driving pump filter				X		
23. Check and service AC system					X	
24. Change of hydraulic oil (or once per year)					X	
25. Clean fuel tank					X	
26. Clean hydraulic oil tank					X	
27. Check pressures of driving hydraulics system. Adjust if needed					X	
28. Check max. pressures of working hydraulics system. Adjust if needed					X	
29. Clean and check fuel injectors					X	
30. Clean cooling system						X
31. Check alternator						X
32. Check starting motor						X

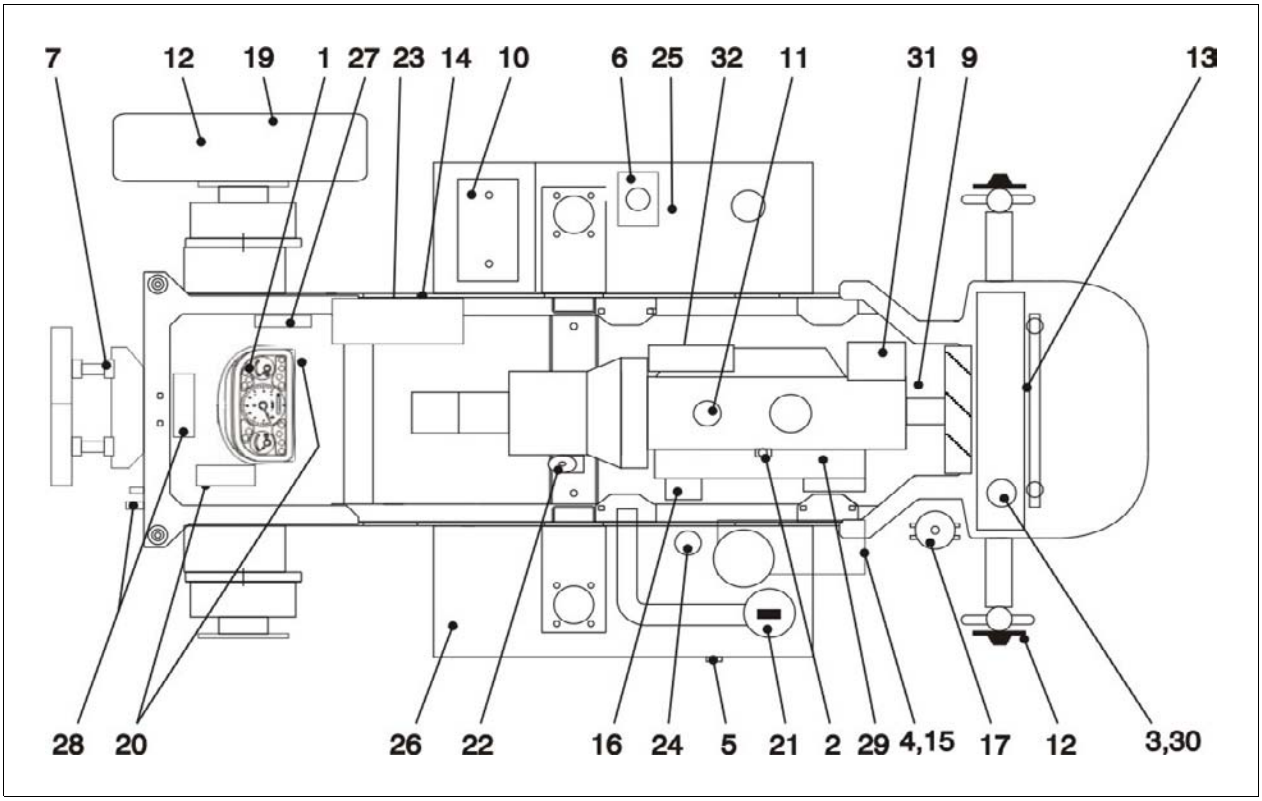
NOTE:

- Daily services and controls should be performed every day before starting to use machine
- 1000 h service should be performed in 1000 h intervals or at least once a year
- 2000 h service should be performed in 2000 h intervals or at least every second year
- When using the machine in very dusty, wet or other wise in very difficult circumstances, the service is recommended to perform more often than service table says.

Service items on machine

NOTE!!

The picture below is suggestive and all the service items are not shown. Position numbers are the same as on the page before this page (Service table). Also detailed service instructions on next pages have the same position numbers to help to identify the targets.



Fluid capacities and lubricant recommendations

Item	Volume	Recommendation	Factory installation	Note!
Fuel tank	35 ltr	DIN E590 Diesel fuel	DIN E590 Diesel fuel	Summer or winter diesel according the weather
Cooling system	9 ltr	Water/glycol 50/50	Water/glycol 50/50	Never use bare water!
Engine oil	5 ltr	15W40 API CE	CASTROL CRD 10W/30	Under -15 ºC terperatures, use multigrade oil 5W-30
Hydraulic oil	55ltr	ISO-VG46 DIN 51524 osa1 DIN 51502 HLP 46	CASTROL AWH 46	
Windscreen washer tank	1,5 ltr	Water/washing agent 50/50	Water/washing agent 50/50	Never use bare water!
Greasing points		Molybdenum sulphide grease	CASTROL MS1 GREASE	
AC		R 134A agent	R 134A agent	

DAILY SERVICES

1. Check operations of indicator lamps

Check that all the cue lights and warning lights are working properly.

2. Check engine oil level

When checking the engine oil level, the machine should be on stable ground. The oil level should be between the markings of dipstick (**1**). Fill oil up to upper marking if needed. Let the engine stay couple of minutes with engine no running before checking in order all oil is flown to the oil sump. The refilling oil should be always the same kind of oil what exists in engine already.

Check the oil details on page 23.

3. Check amount of coolant

WARNING !!!!

Cooling system is pressurized ☞ Risk of burns!

Check the coolant level by opening the cooler filling cap. Be always sure before opening the cap that the cooling system is unpressurized and the engine has cooled down enough because in other wise redhot coolant may spray out with high pressure causing burns. NEVER OPEN THE FILLING CAP WHEN ENGINE IS RUNNING!
Coolant volume is suitable when the level of cold coolant is just over the cooler cells. Never overfill the cooling system.

Coolant agent frost resistance

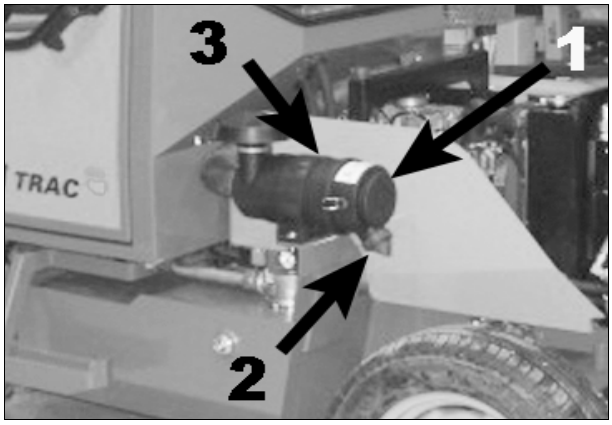
Check the coolant agent frost resistance always before winter season. Refill if needed. Coolant agent is recommended to change every second year.

NEVER USE ONLY BARE WATER IN COOLING SYSTEM!

NOTE !!!!

Use always coolant mixture (50% bare water and 50% "full power" coolant agent).
A proper coolant mixture is good safe against engine freezing and corrosion.

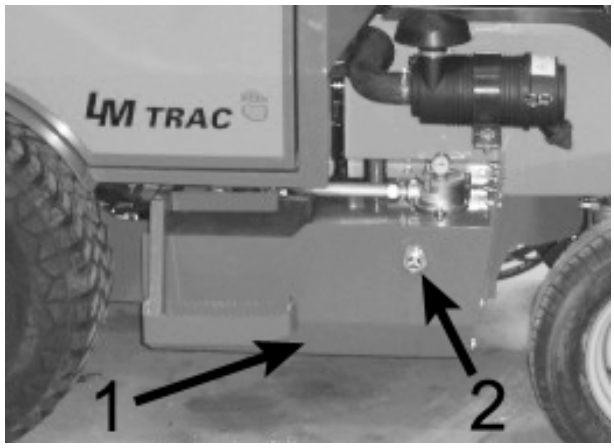
4. Clean engine air filter and pressure indicator of air filter line



Turn off the engine for cleaning the filter. Open collars and remove the filter cover (**1**) backwards. Clean the cover and all the other loosen parts carefully. Remove the filter element by pulling it outwards and turning it at the same time. Clean the filter element by blowing with compressed air from inside outwards.
Check the filter sealings. Install the filter element back to the filter housing by turning it at the same time. Install the cover. Check the dust cap (**2**) several times a day if conditions are very dusty. Keep the dust cap always clean. Dust cap is draining automatically with the help of vacuum when engine is running.
If the cap is filling in spite of very often manual draining, replace the rubber cap immediately.

Check pressure indicator of air filter at the same time. If indicator shows RED, clean the filter and reset the indicator after cleaning. By controlling the indicator continuously, can the state of air filter be found out without opening the filter cover. Check immediately if indicator shows red. Dusty filter should be cleaned or replaced.

5. Check hydraulic oil level



Hydraulic oil (**1**) tank is located on left side of the machine. Sight glass (**2**) is on the outer side of tank. Tank volume is about 55 liters.

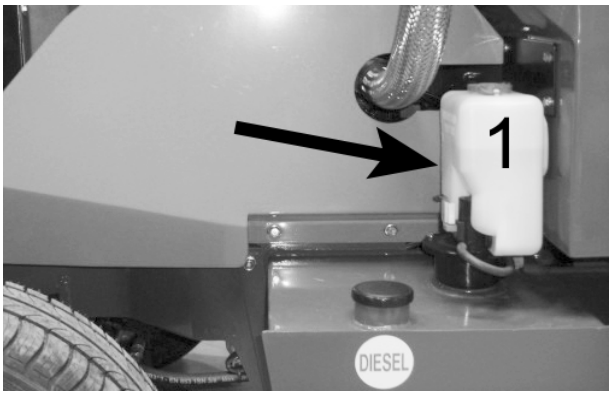
Oil level should be checked while machine standing on level surface and implements lowered down on the ground. Oil level should be in the middle of sight glass when oil is cold.

Hydraulic oil filling cap is located inside the engine hood. When filling oil, be sure that the filling hole and the environment nearby are clean. Use only clean oil for filling.

THE REFILLING OIL SHOULD BE ALWAYS THE SAME KIND OF OIL WHAT EXISTS IN ENGINE ALREADY.

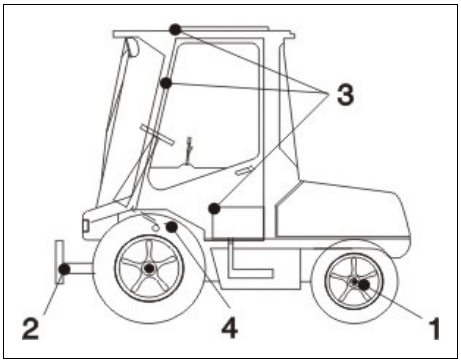
Check the oil details on page 23.

6. Check windscreen washer tank filling



Check that there is always enough washing liguid in washer tank (1). Never user bare water in washer tank. Use always a proper washing liguid mixture. Washer tank capacity is 1,5 ltr.

7. Grease nipples (weekly or at least 50h)



ITEM	AMOUNT OF NIPPLES
1. Rear axle	6 pcs (2-WD)
	4 pcs (4-WD)
2. Front lift	5 pcs
3. Doors and shutters	8 pcs
4. Driving and brake pedals	(with light oil can)
5. Hinges of tipper	2 pcs

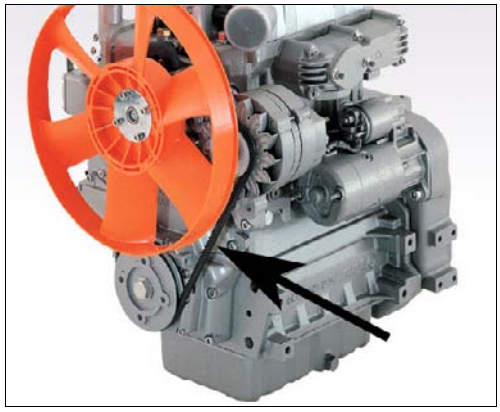
Check the grease details on page 23

MAINTENANCE AT 125 HOURS INTERVALS

8. Check items 1-7

Check items 1-7 according the info on pages 24 and 25.

9. Check fan belt tension



Belt tension is good when it adabts about 10 mm when pressed softly by finger. The belt should be pressed on the middle of pulleys, in arrow pointed place.

Belt tension adjustment:

- Loose the alternator fastening screws
- Turn the alternator to get the belt tight
- Tighten the alternator fastening screws carefully

Check the belt state. If the belt is too loose, worn or oily, charging or cooling problems may occur. Keep the spare belt always available.

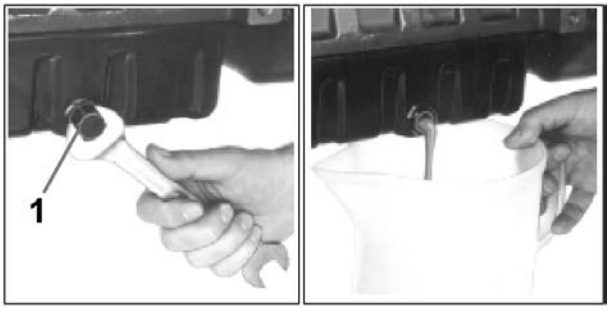
10. Check battery electrolyte level

- Remove the battery cover in order to check the battery
- Battery electrolyte level should be 5-10 mm above the cells
- Add distilled water if filling degree is too low
- Never add acid into the battery. Do not expose the battery to open flames

Keep the battery surface always clean and dry. Coat the terminals and cable couplings with grease.
NOTE! In winter time it is important to run the engine for a while after adding distilled water. Otherwise the water may not mix with the acid and freezes.

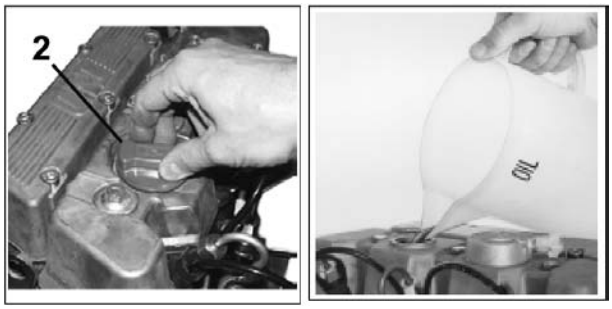
11. Change engine oil (5 ltr)

Draining:



Drive the engine oil warm. Stop the engine and open the drain plug (**1**). Drain the waste oil into a big enough container. Clean and close the drain plug. Remove the oil dipstick in order the help the draining.

Filling:



Refill the engine with new and clean oil through the filling cap (**2**) up to the upper mark of dipstick.

NOTE!!

Oil flows faster down to the oil sump if you remove the oil dipstick.

Let the engine run for a while and recheck the oil level. Refill if needed.

Oil filter is recommended to change always at the same time with engine oil.

Engine oil volume is about **5 ltr** including the filter change.

Check the oil details on page 23.

NOTE!!

Take always care of appropriate disposal of waste oil.

12. Check tightness of wheel bolts

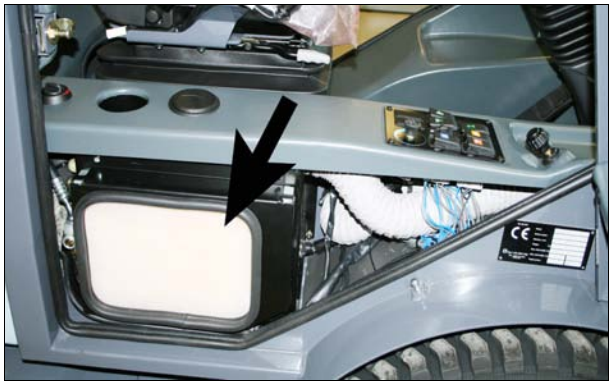
Check tightness of wheel bolts. Tighten bolts if needed.

13. Clean radiator, oil cooler and AC-cooler

Clean the radiator cell, oil cooler cell and AC condensor cell by blowing with pressurized air away from engine. Never use pressure washer. Also the mechanical cleaning with brush is not allowed.

MAINTENANCE AT 250 HOURS INTERVALS

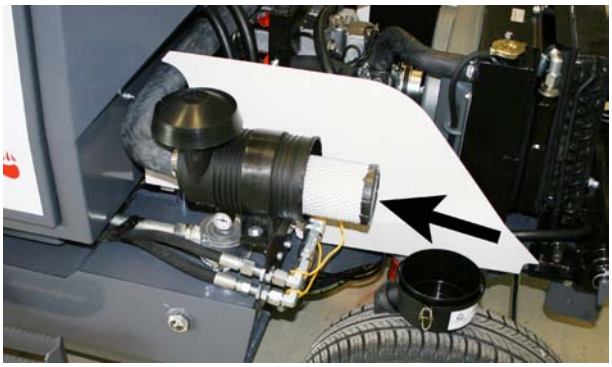
14. Clean cabin incoming air filter

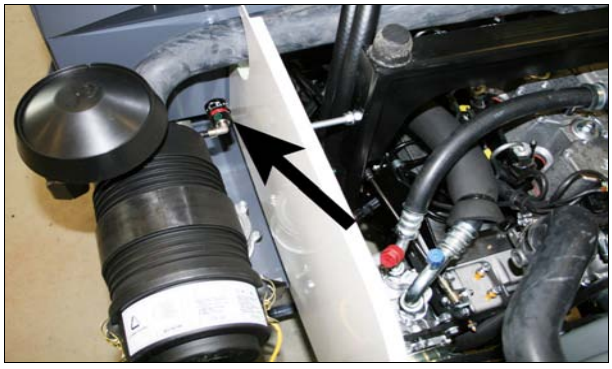


Fresh air filter is located behind the right door. Open the door and remove the filter. Clean the filter with pressurized air from clean side towards the dirty side. Replace a broken or very dirty filter immediately.

Cabin air filter code: **400129081**

15. Change engine air filter





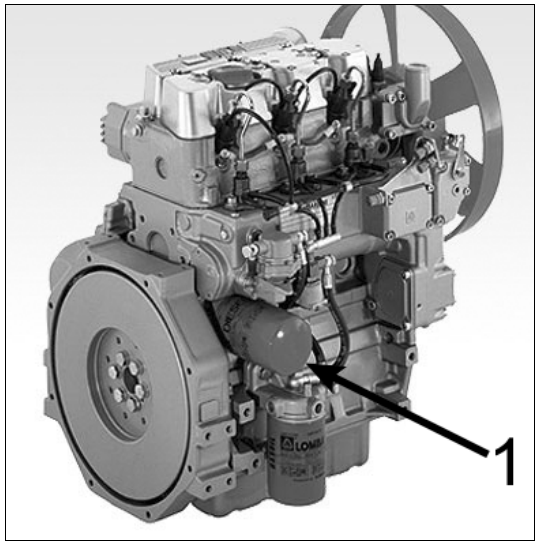
Engine air filter should be changed immediately when the indicator shows red. Stop the engine when changing the filter. A blocked-up filter will cause changes on the engine sound, increased smoking or reduced power.

Remove the old filter and install a new filter carefully.

Engine air filter code: **605129022350**

See the installation information on chapter 4 (filter cleaning).

16. Change engine oil filter



Engine oil filter (**1**) is recommended to change every time when engine oils are changed. See more information about oill change in chapter 11 on page 21.

Drain first engine oils which after filter change can be done.

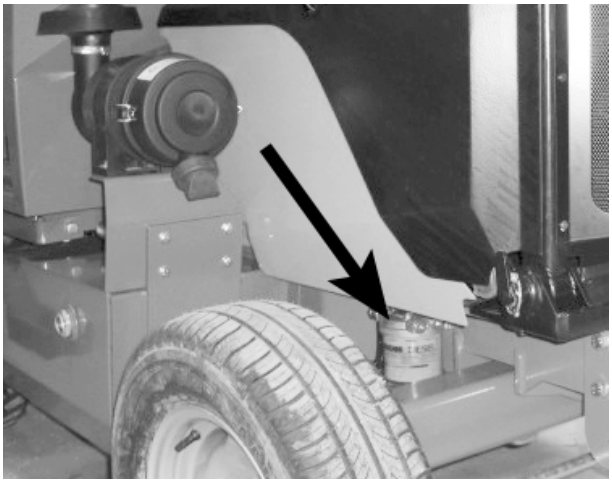
Filter change:

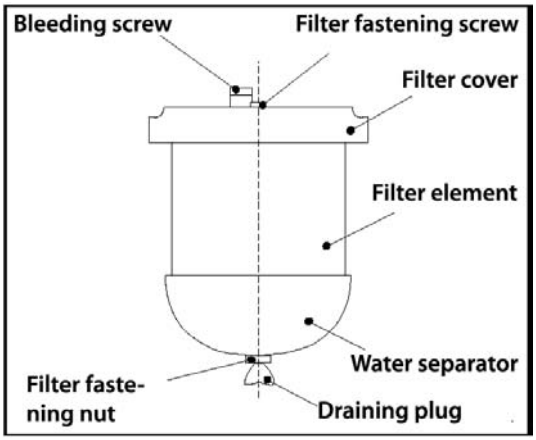
- Unscrew the old filter.
- Clean all oil leaks on the engine with clean rag.
- Lubricate the sealing of new filter with new and clean oil.
- Install the new filter by "bare" hands. Turn the filter until it stops to the sealing. Make the final tightening **manual** by turning the filter about 1/2 round. Never use any hand tools for tightening
- Refill the engine oil according chapter 11.

Engine oil filter code: **60512901992**

Engine oil volume is about **5 ltr** including the filter change.

17. Clean fuel water separator and change fuel filter





Water separator draining:

- Open the drain plug underneath the filter and drain the filter housing
- Close the drain plug

Changing fuel filter:

– Open the tensioning screw on the top of the filter (hold on the tensioning nut under the filter if needed) and remove the old filter

– Clean parts before reinstallation

– Install the new filter and sealings

– Bleed the filter by opening the bleeding screw on the top of the cover and pumping the hand lever at the same time until no air mixed fuel is coming out of bleeding screw. Close the bleeding screw carefully in the end.

Fuel filter code: **60512901993**

18. Check oil leaks, joints tensionings, couplings and hoses

Check possible oil leaks on machine - engine and hydraulic system.

Check that all the couplings are tight - bolt connections, hose connections as well as all the other connections and joints.

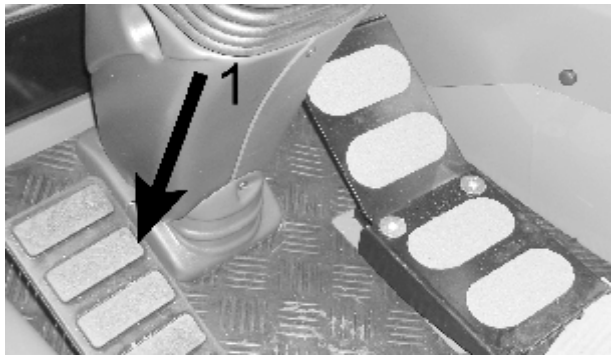
Check all the hoses - hydraulic hoses, water hoses and air hoses as well as channels. Replace worn or otherwise damaged hoses immediately.

19. Check tyre pressures

LM TRAC 286 is a multipurpose machine for several different tasks where proper tyre pressure is recommended to use. Suitable tyre pressure range is **0,9-2,0 bar** in front and **1,2-2,0 bar** in rear. So called all-round pressure is **1,6 bar** in front and rear if something else is not mentioned by certain implement.

See the tyre alternatives on chapter "*Technical Data*" on page 40.

20. Check brake functions



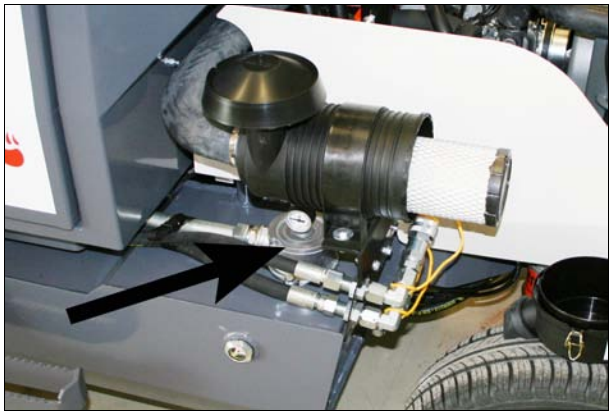
Check the functions of brake foot pedal (**1**) and parking brake switch (**2**).

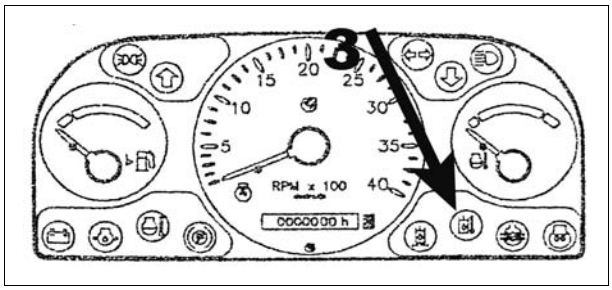
Machine should stay where it is safely on a 20% slope when parking brake switched on.

Contact the authorised workshop immediately if brakes are not working properly. Never use the machine if brakes are not working properly.

MAINTENANCE AT 500 HOURS INTERVALS

21. Change hydraulic oil return filter element (500 h intervals or at the service indicator message)





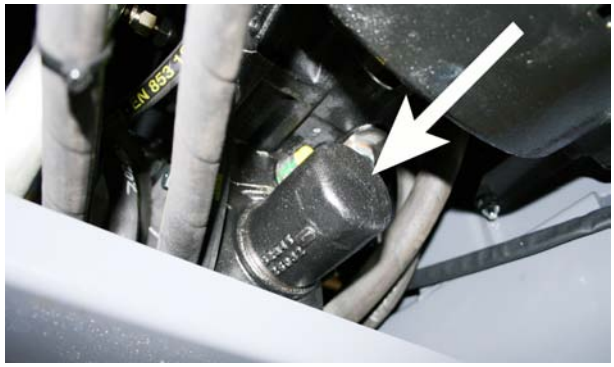
Replace the filter element immediately when the pressure gauge on top of the filter shows **1,0 bar** when hydraulic oil temperatue is about +40 ºC and engine rpm is about 2000 r/min or when warning light (**3**) for hydraulic filter blockage in meter panel lights up. Otherwise the filter change should be done according the service table

Hydr. return filter code: **60512901994**

Filter change:

- Stop the engine
- Remove the return filter cover (3 screws)
- Pull the old filter element out of the filter housing
- Clean all the parts and sealings carefully
- Install a new filter element, use also new O-rings
- Install the filter cover, tighten the screws carefully.
- Start the engine and check possible oil leaks.

22. Change driving pump filter (500 h intervals or at the service indicator message)



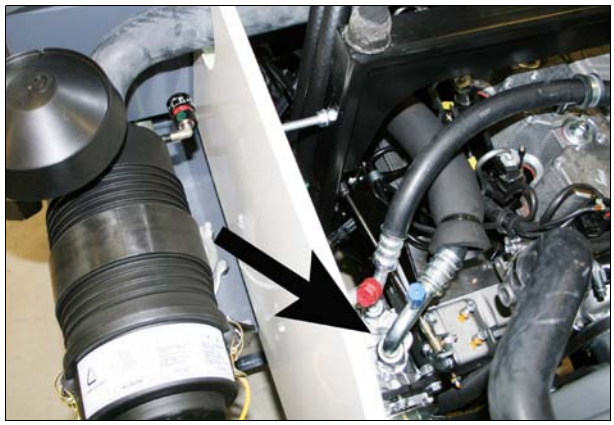
Driving pump filter is located behind the driving pump underneath the machine. Driving pump is on the front of the engine.

Replace the filter immediately when the indicator alarms when hydraulic oil temperatue is about +40 ºC. Otherwise the filter change should be done according the service table (500 h intervals)

Driving pump filter code: **6051290410**

Remove the old filter by rotating it. Lubricate the sealing of new filter with new and clean oil and install the filter. Make tightening by hand. Start the engine and check the possible oil leaks.

23. Check and service AC-system



Check the AC-system operation. AC-system repairs and coolant agent refillings should be carried out by authorised workshop.

MAINTENANCE AT 1000 HOURS INTERVALS

24. Change hydraulic oil (or once per year) (55 ltr)

Draining:

- Warm up the hydraulic oil by using hydraulic functions
- Open the drain plug on the bottom of the tank and drain the waste oil into the container big enough
- Install the drain plug. If teflon sealing is used, be careful that no teflon crumbs gets into the tank.

NOTE!!
Take always care of appropriate disposal of waste oil.

Filling:

- Fill the tank with new and clean hydraulic oil up to middle of sight class (about 55 ltr) through the filling cap under the engine hood.
- Let the engine run for a while and lift up and down the front lift at the same time. Turn off the engine and recheck the oil level. Refill oil if needed.

Check the oil details on page 23.

25. Clean fuel tank

Clean the fuel tank always before winter season to avoid fuel system problems caused by condensing water. The best way to prevent water condensation into the fuel tank is to keep it always as full as possible.

Cleaning fuel tank:

- Remove the drain plug on the bottom of the tank and drain the tank into the container big enough. Never drain the fuel into the ground
- Rinse the tank with clean fuel if needed
- Clean the drain plug and install it back. If you use adhesive teflon tape for sealing, make sure no bits of tape is getting into the tank.
- Fill the tank with new and clean fuel

WARNING!

NEVER USE SPIRIT MIXED WITH FUEL, as it reduces the lubricating characteristics of fuel and may damage gaskets.

26. Clean hydraulic oil tank

Draining:

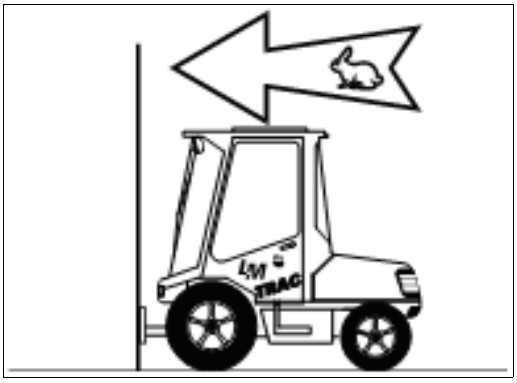
- Heat up the hydraulic oil by loading the hydraulics system
- Lower down the front lift and turn off the engine
- Open the draing plug on the bottom of tank and drain the oil into a container big enough
- Rinse the tank with clean oil or with washing agent. When using washing agent, be careful not to leave washing agent residuals or water into the tank.
- Install the draing plug. If Teflon sealing is used, be careful not to let sealing bits get into the tank

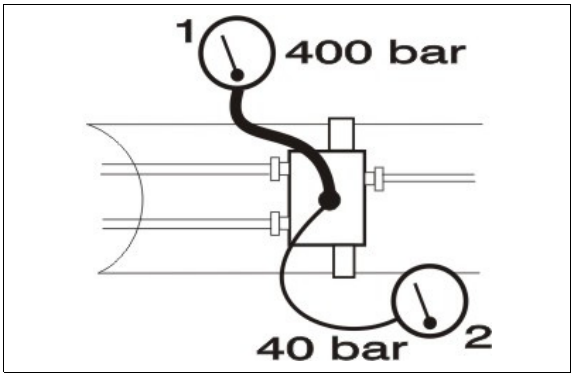
Fill the tank according chapter 24.

27. Check pressures of driving hydraulics system. Adjust if needed.

NOTE!!

Follow always all the safety regulations when performing measurings (exhaust fumes, to be run over by machine etc ..)





Measuring driving hydraulics max pressure, meter no 1

Connect the pressure meter no (**1**), (0-100 bar) according the picture above. Drive the machine against the wall, switch on parking brake and select speed range **II**. Drive tractor slowly towards the wall. The meter shows the max. pressure for a moment (set value 280 bar).

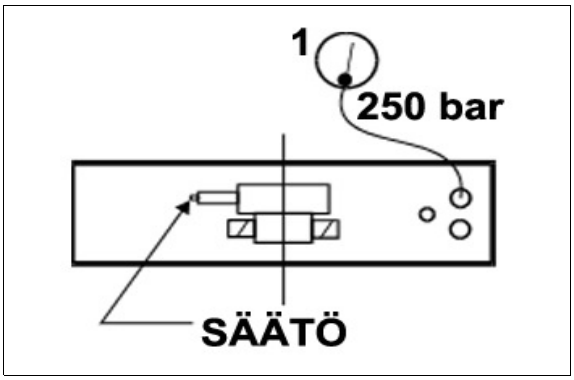
Measuring feed hydraulic pressure, meter no 2

Hydraulic oil should be warmed up to +40 ºC by driving the machine or by loading the hydraulics system. Connect the pressure meter no (**2**), (0-40 bar) according the picture above. Set driving pedal into the middle position (neutral) and adjust the engine rpm to 1500 r/min. Pressure meter shows the max. feeding pressure (set value is 20 bar).

28. Check max pressures working hydraulics system. Adjust if needed.

All the following measurings should be carried out when hydraulic oil temperature is about n. +40 ºC.

Measuring motor hydraulics pressures:



Connect the pressure meter (**1**), (0-250 bar) to the upper coupling of motor hydraulics according the picture above. Start the engine and set engine rpm to 2000 r/min. Switch on the motor hydraulics on (the so called "normal" rotation direction). The meter shows the max. pressure (set value 200 bar). Adjust the pressure by turning the valve underneath the cabin.

Measuring and adjusting of lift and other cylinder functions

Check of max pressure:

Connect the pressure meter (0 - 250 bar) to some output of cylinder hydraulics as shown in picture. Adjust the engine running about 2000 rpm. Use the hydraulic cylinder function connected to meter. The meter should show value max 150 bar. Make the adjustment with a screw located inside the cabin.

29. Clean and check fuel injectors

On the condition that the engine can run smoothly, the injectors must be clean and in good shape. It is better to leave the injector check to an expert.

How do you notice dirty or faulty injectors?

Knocking indicates a defective injector. When idling and when the engine is cold, knocking does not mean necessarily a fault, but if the knocking sound is heard also in normal operating temperature, the fault is probably in the injectors.

Knocking may also be caused by air in the fuel system.

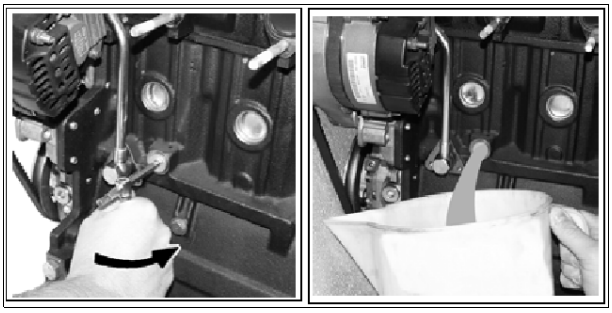
Excessive smoke indicates problems in injectors (unless the smoking is caused by a blocked-up air filter, for example).

MAINTENANCE AT 2000 HOURS INTERVALS

30. Clean cooling system

Clean the cooling system properly as described below:

DRAINING AND WASHING:



- Open the coolant refilling cap
- Open the drain plug on cylinder block and loose all the water hoses going to heater unit. Make the cooling system empty. Use big enough container to collect all the old coolant. Loose also the hoses going to water cooler.
- Make the water pump empty by rotating it with starter motor couple of seconds
- Clean the drain plug and install it back. Tighten carefully.

NOTE!!

Take care that the used coolant will be destructed properly. Don´t pour coolant into the nature!

FILLING:

Fill the system with a mixture of water and anti-freeze agent (50/50) through the radiator filler hole (50 % fresh water and 50 % "raw" antifreeze agent).
The cold coolant level should be at least over the cells. Close the cap tightly.
Run the engine until it has reached it´s normal operating temperature and add mixture if necessary.
Follow the manufacturer´s instructions when making coolant mixture (50/50)

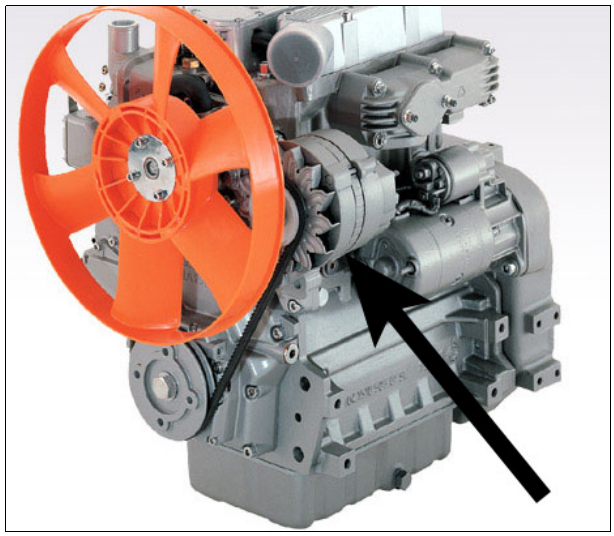
Never use bare water or undiluted coolant agent (100 %).

Cooling system volume is about **9 ltr.**

WARNING!

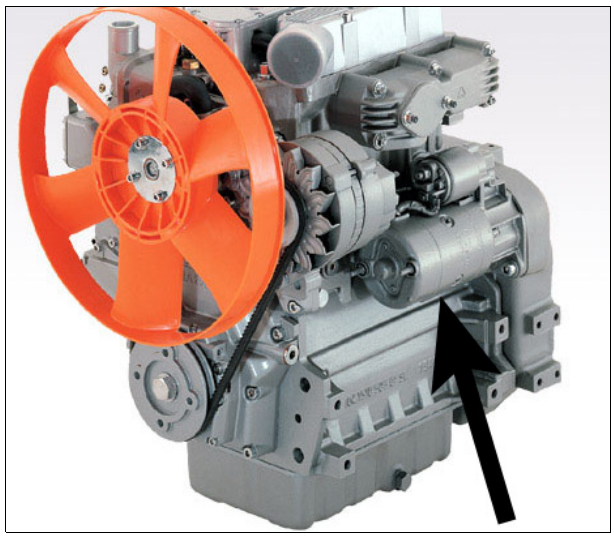
Never fill a hot engine with cold coolant. Be very careful when opening the cap of a cooling system containing hot coolant under pressure!

31. Check alternator



Check that all alternator wirings are in good shape and connections clean. Dirty and loose connections may cause charging problems.

32. Check starting motor



Check that the wirings and connectors are in good shape and clean. Repair, if necessary.

OBSERVATION MATTERS ON SERVICE

ENGINE

Bleeding fuel system

Fuel system has an automatic bleeding system for example when fuel runs out. When changing the fuel filter, you have to use manual bleeding. See the chapter 17 on page 28.

Air filter

The air filter prevents dust and other impurities to mix with the engine intake air. The wear of the engine depends a lot of the purity of the intake air. Therefore it is very important to check the air filter regularly. Air filter should be as clean as possible during the machine use. In this way you can assure a long lifetime for the engine.

Air filter maintenance

When cleaning the air filter, check also that the filter elements and gaskets are in good shape. A damaged filter should be replaced immediately with a new one. Clean the filter dust cap daily.

NOTE !!!!!

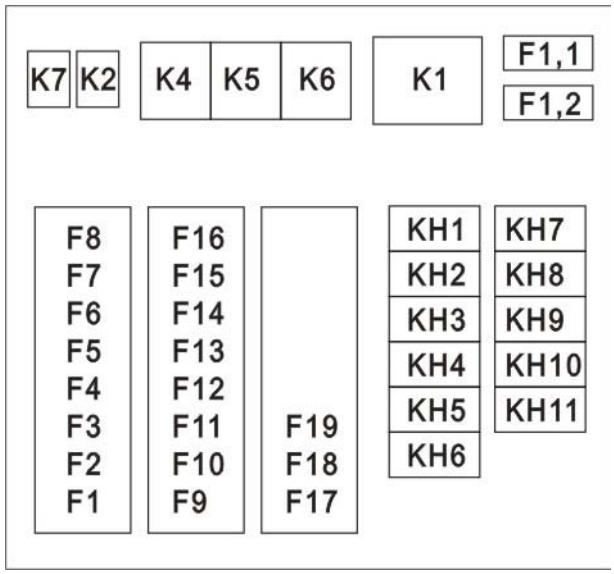
Do not remove or clean the filter unnecessarily. When the filter is removed, it is always possible that impurities get into the intake manifold.

ELECTRICAL SYSTEM

Fuses and relays

Fuses and relays are located inside the box under the seat. You can check and change fuses by leaning the seat forward. Keep the fuse boxes always clean. When changing a fuse, always find out the fault which caused the fuse burning.

FUSES AND RELAYS



FUSES

POS	FUNCTION	FUSE
F1	**P**arking light, left	**3 A**
F2	**P**arking light, right	**3 A**
F3	**D**riving light, left	**7,5 A**
F4	**D**riving light, right	**7,5 A**
F5	**H**eadlights	**10 A**
F6	**C**ue lights / **M**eters	**7,5 A**
F7	**W**ipers / **D**rizzle / **W**asher	**10 A**
F8	**G**low relay control / **W**orking lights, front	**15 A**
F9	**B**linkers	**10 A**
F10	**P**arking brake / **4**-WD	**7,5 A**
F11	**A**ntislip device / **S**low drive / **B**rake light / **R**eversing buzzer	**10 A**
F12	**M**irror heating / **R**adio / **I**nner light / **A**ir seat	**10 A**
F13	**M**otor hydraulics / **T**ipper-hydraulics (YH9 ja YH10)	**7,5 A**
F14	**W**orking lights, rear	**7,5 A**
F15	**H**eater fan / **A**C	**15 A**
F16	**E**ngine stop relay	**10 A**
F17	**H**azard / **R**ot. warning light	**15 A**
F18	**R**adio memory / **I**nner light switch	**7,5 A**
F19	**J**oystick	**20 A**
F1,1	**G**lowing	**50 A**
F1,2	**M**ain current	**50 A**

RELAYS

POS	FUNCTION
K1	Main current
K2	Engine start prevention
K4	Blinkers
K5	Drizzle
K6	Glowing
K7	4-WD

RELAYS FOR FRONT VALVES

POS	FUNCTION
KH1	**V**alve YH1
KH2	**V**alve YH2
KH3	**V**alve KV (Front lift floating)
KH4	**V**alve YH3
KH5	**V**alve YH4
KH6	**Y**H4 valve floating
KH7	**V**alve YH5
KH8	**V**alve YH6
KH9	**Y**H6 valve floating
KH10	**V**alve YH7
KH11	**V**alve YH8

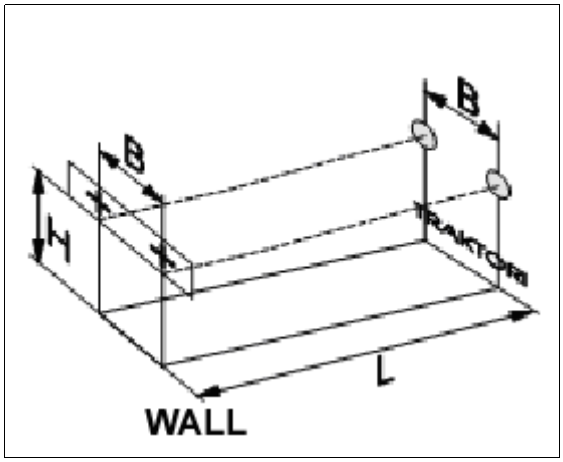
Precautions when servicing electrical system!

- Disconnect always battery cables first when servicing or repairing electrical system
- Disconnect always the grounding cable (**-**) first when disconnectiong cables.
- Be careful when connecting cables. Connect always the PLUS-cable (**+**) first and grounding cable after that when connectiong cables.

NOTE!!!
Do not smoke nearby the battery. **Never expose** the battery to open flame!

ADJUSTING HEADLIGHT AIM

Headlight aiming is very important, especially when you are driving on public streets and roads. Optical aiming is a fast and accurate operation which can be made in service stations or in repair shops. If it is not possible to use optical equipment, aiming can be made according the following picture



- Check before the adjusting that the tractor is normally loaded and tire pressures are correct.
- Drive the tractor in the front of wall.
- Tick off two points in to the wall in the middle point of the headlights.
- Reverse the tractor 5 meters off the wall.
- Switch on the headlights. The center point of the beam should be 50 mm lower than those ticks.
- If necessary, adjust vertically and horizontally.

The beam should be in height **H** when tractor is in distance **L** from the wall. Adjust the aiming if needed.

Dimensions

L = 5m
B = distance of headlight center points
H = height of headlight from ground minus 50 mm.

MACHINE STORING

STORING

Less than 2 months

No special measure are needed if :

- tractor has been serviced regurlarly
- tractor is clean
- coolant freezing resistance has been controlled
- fuel tank is full
- battery is stored properly

More than 2 months

- Clean outside and make general greasing
- Clean fuel tank
- Add 5 liters so called protective fuel or 1,5% oil in to the fuel tank.
- Full fill the fuel tank with gas oil.
- Clean water separator; drip pot (water etc).
- Change engine oil and filter.
- Clean engine air filter and filter housing, replace the element if needed.
- Store the machine in a dry and warm place without direct sunlight, if possible.
- Measure coolant freezing resistance and battery capacity
- Remove the battery and store it to a cool, dry and steady temperature place with good ventilation. Check the battery capacity every month.
- Run the engine to reach the normal usage temperature and drive for a while.
- Lift front lift to the upper position
- Remove injectors and pour protective oil to each cylinder about 0,5 deciliter.
- Rotate the engine with starting motor for a while without starting it.
- Reinstall injectors, use new gaskets.
- Loosen the fan belt.
- Protect parts exposed to corrosion with protective oil (CRC or similar).
- Use cellophane film to cover air filter and exhaust pipe hole.

FROM STORAGE INTO USE

After less than 2 month´s storage

- Check oil and fluid levels as well as tyre pressures.
- Make a general greasing.
- Bleed fuel system if needed.
- Install charged battery.
- Rotate the engine with starter motor for a while or until the oil pressure cue light turns off (without starting the engine).
- Start the engine, but don´t rush it suddenly.
- Make a test drive to get ensured that all functions are working properly.

After more than 2 month´s storage

- Check tyre pressures.
- Remove protective covers.
- Tighten the fan belt.
- Rotate fan blades by hand carefully forward and backward to unfasten possibly stucked gaskets or circulating pump.
- Remove protective grease.
- Remove rocker arm cover and lubricate the valve mechanism with engine oil.
- Check oil and fluid levels.
- Bleed the fuel system if needed.
- Mount the charged battery.
- Rotate the engine with starter motor for a while or until the oil pressure cue light turns off (without starting the engine).
- Start the engine, but don´t rush it suddenly.
- Make a test drive to get ensured that all functions are working properly.

TECHNICAL DATA

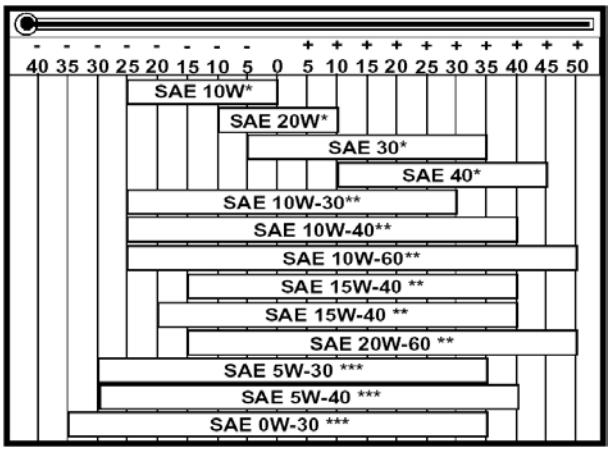
ENGINE		
Model and type	Lombardini LDW 1603 CHD PLUS, 3 cylinder 4 cycle diesel, water cooled, indirect fuel injection, rotation counter clockwise looked from flywheel side	
Piston displacement	1649 cm³	
Cyl. dimens., bore x stroke	88 x 85 mm	
Compression ratio	22:1	
Engine power, ISO 3046 IFN	27,6 kw (37,5 hp) / 2400 r/min	
Max. torque	113 Nm / 1600 r/min	
Idling speed	900 r/min	
Air filter	Dry paper filter	
Lubricating system	Gear pump, replaceable flow filter	
Water pump output	75 ltr / 3000 r/min	
Cooling system	Thermostat controlled overpressurized system	
DRIVING HYDRAULICS		
	Closed 2-wheel (or 4-wheel) drive system with pedal driving director reverser. Two driving speed ranges	
Driving pump	Rexroth, variable-volume axialpiston pump - Output 0- 60 ltr/min / 2400 r/min - Pressure 350 bar - Safety valve opening pressure 350 bar - Feed pressure max 2,5 Mpa (25 bar)	
Hub motors	Two-speed radial piston type cam motor	
Antislip device	Electro-hydraulically controlled for front axle (and for rear axle on 4-WD model)	
Speed ranges	Electro-hydraulically controlled	
	2-WD	4-WD
- speed range **I**, slow	0 – 10 km/h	0 – 6,5 km/h
- speed range **II**, fast	0 – 20 km/h	0 – 13 km/h
- reverse, max.	10 km/h	6,5 km/h
Max pump volume per rev.	25 cm³ / r	
WORKING HYDRAULICS		
	Open fixed output system	
Working pump	Gear pump	
Control valves	1-spindle (motor hydraulics)	
Motor spindle control	Electrical ON/OFF control	
Max pump volume per rev.	19,7cm³/r	
Pump volume	47 ltr/min / 2400r/min	
System max pressure	200 bar (opening pressure for safety valve)	

STEERING HYDRAULICS	
	Hydrostatically assisted rear wheel steering with LS-function, orbitrol-system
Steering pump	Gear pump
Steering valve	Danfoss
Steering cylinders	1 pc
Pump volume	Max. 15 dm³/min
Max. pressure	8 MPa(80 bar)
BRAKES	In the hub motors of the front axle, built-in spring loaded oil bath lamella (multidisc) brakes used as driving and parking brakes. Also the automatic brake function of the fully hydraulic power transmission.
ELECTRICAL SYSTEM	
Voltage	12 V
Starter motor	2,2 kW, 12V
AC alternator	65A, 12V
Battery	75 Ah, 12V, negative grounding (-)
Headlight lamps	H4 60/55W 12V
Working light lamps	H3, 55W, 12V
Parking light lamps	5W, 12V
Rotating flashlight	55W, 12V
Fuses	19 pcs, 3-20A + 2 pcs, 50 A
FLUID CAPACITIES	
Fuel tank	35 ltr
Hydraulics oil system	55 ltr
Engine oil	5 ltr
Windscreen washer container	1,5 ltr
Cooling system	9 ltr
AC system	

Engine oil viscosities:

Alternatives for engine oil viscosity in different temperatures:

* Monograde, mineral based
** Semisynthetic
*** Synthetic



DIMENSIONS (with standard tyres)		
Lenght	2680 mm	
Width	1340 mm	
Height	2095 mm	
Wheelbase	1540 mm	
Gauge	1005 mm	
Turning radius, min	1025 mm	
Turning radius, max	2825 mm	
Ground clearance	180 mm	
WEIGHTS		
Tare	1140 kg	
Front axle weight	720 kg	
Rear axle weight	420 kg	
Max allowable front axle load	1600 kg	
Max allowable rear axle load	1200 kg	
Max allowable gross weight	1600 kg	
TYRES (standard)		
Front	31 x 11,5 – 15	(Tyre pressure 0,9 – 2,0 bar)
Rear	175/13	(Tyre pressure 1,2 – 2,0 bar)
Wide green area tyres, front	31 x 13,5 – 15	(Tyre pressure 0,9 – 2,0 bar)

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